

1/19/16

# Physics S1

Newtonian Physics

# Physics S2

Electromagnetic Spectra

## On your computer:

- Open the Chrome browser
- Go to: [www.google.com](http://www.google.com)
- Login: [studentid@dpsk12.net](mailto:studentid@dpsk12.net)
- Click **SignIn**
- Next page, username: [studentid#](#)
- Password: what you just used to log into the computer
- Open Gmail & send e-mail to: [mmelosh@dpsk12.net](mailto:mmelosh@dpsk12.net), subject: I'm in

1/19/16

**Every day each group will need:**

- **One physics textbook**
- **One computer**

Each activity includes:

WDYS

WDYT

Investigate

Physics Talk

Checking up

Physics to Go



# Chapter 1: Driving the Roads

## Chapter Challenge

- 10 pts - 2-3 min. talking (>5 min, ea. 1 min -2pts)
- 28 pts - relationship bet. braking distance, following distance, & total stopping distance, & factors that affect each
- 28 - connections between speed, friction, & radius of curve when turning
- 10 - graphs, charts, or posters (5 pts. ea. up to 15 pts)  
(2 req'd)
- 5 - written report
- 24 pts - oral presentation score
- 95 pts

## Section 1: Responding to Road Hazards (p. 8)

1/20/16

**WDYS** Car crash on the mountain, yellow + orange cars crashed, orange flipped, blue car trying to stop, smoke from orange car + blue car's tires because of braking, green grass, bunny, orange car leaking, Billy's hat flew off

**WDYT** Obnoxious child, texting, phone call, eating, panic, looking out side windows, argument w/ passenger, looking for things inside the car, putting on make up, drinking a beverage, emotions, daydreaming, music, smoking, alcohol, mj, recreational drugs, tired

I will use multiple methods to measure and describe reaction time.

- I will use multiple methods to measure and describe reaction time.

Via

- Participating in collaborative experiments
- Team and whole class discussions to clarify key concepts
- Collaboratively answering questions targeting key concepts

## Section 1: Responding to Road Hazards (p. 8)

1/20/16

Investigate:

Method B (10 min)

Reaction Time with Distractions (10 min) 1/21/16

I will use multiple methods to measure and describe reaction time.



## Reaction time and distractions

The time it takes to respond to a situation is greater with distractions. Most distractions can be avoided.

## Other factors affecting reaction time

alcohol, drugs, age, gender, experience, fatigue, exercise, attentiveness, personality

I will use multiple methods to measure and describe reaction time.

1/21/16

Exit ticket: Physics to Go #4 (p.19),  
#7 & 8 (p.20)

Answer in a full sentence.

### Section 3: Average Speed: Following Distance and Models of Motion (p. 34)

1/22/16

**WDYS** bunny has returned, yellow hit red which hit blue car, brown + pink cars are separated, distance post marked "3", yellow is tailgating causing a chain reaction, mountains w/ lake + sailboat, all travelling quickly, all women driving

**WDYT** A safe following distance depends on speed,  
25 mph : 20 m following distance  
highway speed : 100 m so you have time to stop  
lower speeds : 1 car length  
faster speeds : 2 car lengths

I will use multiple methods to measure and describe speed, define and contrast average speed and instantaneous speed, and create and interpret graphs to understand and calculate speed.

## Section 3: Average Speed: Following Distance and Models of Motion

1/22/16

- I will use multiple methods to measure and describe speed
- Define and contrast average speed and instantaneous speed
- Create and interpret graphs to understand and calculate speed.

Via

- Participating in collaborative experiments
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### Section 3: Average Speed: Following Distance and Models of Motion Physics Talk (pp. 37-46)

Speed - the distance travelled per unit time

distance - how far?, length

Constant speed - speed does not change

Strobe photos - slower speed: shorter distance  
faster speed: longer distance

Average speed =  $\frac{\text{total distance travelled}}{\text{time taken to travel}}$

$$V_{AV} = \frac{\Delta d}{\Delta t}$$

distance = meters (m)

time = seconds (s)

I will use multiple methods to measure and describe speed, define and contrast average speed and instantaneous speed, and create and interpret graphs to understand and calculate speed.

### Section 3: Average Speed: Following Distance and Models of Motion Physics Talk (pp. 37-46)

V volts

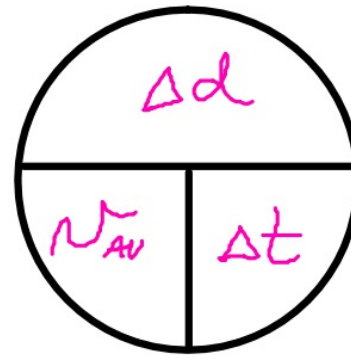
$v_{av}$  Velocity

Instantaneous speed - the speed measured during an instant

$$v_{av} = \frac{\Delta d}{\Delta t}$$

$$\Delta d = v_{av} \cdot \Delta t$$

$$\Delta t = \frac{\Delta d}{v_{av}}$$



$$v \left( \frac{m}{s} \right)$$

Velocity - Speed w/ direction

I will use multiple methods to measure and describe speed, define and contrast average speed and instantaneous speed, and create and interpret graphs to understand and calculate speed.

### Section 3: Average Speed: Following Distance and Models of Motion Physics Talk (pp. 37-46)

doppler effect - sounds get (seem) louder as the source gets closer and quieter as the source gets farther away

$$f = \frac{f_0 \cdot s}{s - v} \quad f_0 \cdot s / (s - v)$$

$f$  (Hz)

reaction distance - (m) how far you travel from when something happens until you react to it

I will use multiple methods to measure and describe speed, define and contrast average speed and instantaneous speed, and create and interpret graphs to understand and calculate speed.

## Section 3: Average Speed: Following Distance and Models of Motion

CU

Checking Up: #1-4 (p.46)

PtG

Physics to Go: #4-7, 12 (pp.49-50)



## Section 4: Graphing Motion: Distance, Velocity, and Acceleration

p.52

1/27/16

**WDYS** I see a guy doing a wheelie in his red car when the light turned green. He drove off so fast that his blue hat flew off & he almost ran over a man & his dog. The woman in the yellow car seemed to be driving normally with her cat in the back seat. The woman standing in front of the garage witnessed the events... --- /

**WDYT**

Similarities: both have wheels, engines  
both get to 30 mph  
both start at 0 mph

Differences: the heavier bus takes longer to accelerate

## Section 4: Graphing Motion: Distance, Velocity, and Acceleration

2/01/16

### IWBAT

- Define acceleration using words and an equation;
- Calculate speed, distance, and time using this equation
- Interpret distance-time and velocity-time graphs for different types of motion.

### Via

- Participating in collaborative experiments
- Team and whole class discussions to clarify key concepts
- Collaboratively answering questions targeting key concepts

## Section 4: Graphing Motion: Distance, Velocity, and Acceleration

Investigate: (p. 52)

IWBAT define acceleration using words and an equation; calculate speed, distance, and time using this equation; and interpret distance-time and velocity-time graphs for different types of motion.

## Section 4: Graphing Motion: Distance, Velocity, and Acceleration Physics Talk (p.58)

The change in ~~speed~~<sup>velocity</sup> is called acceleration.

Velocity with respect to time  
speed + direction

Acceleration is caused by a change in speed, direction, or both.

Vector - any quantity that has magnitude and direction (velocity)

Scalar - has only magnitude (speed)

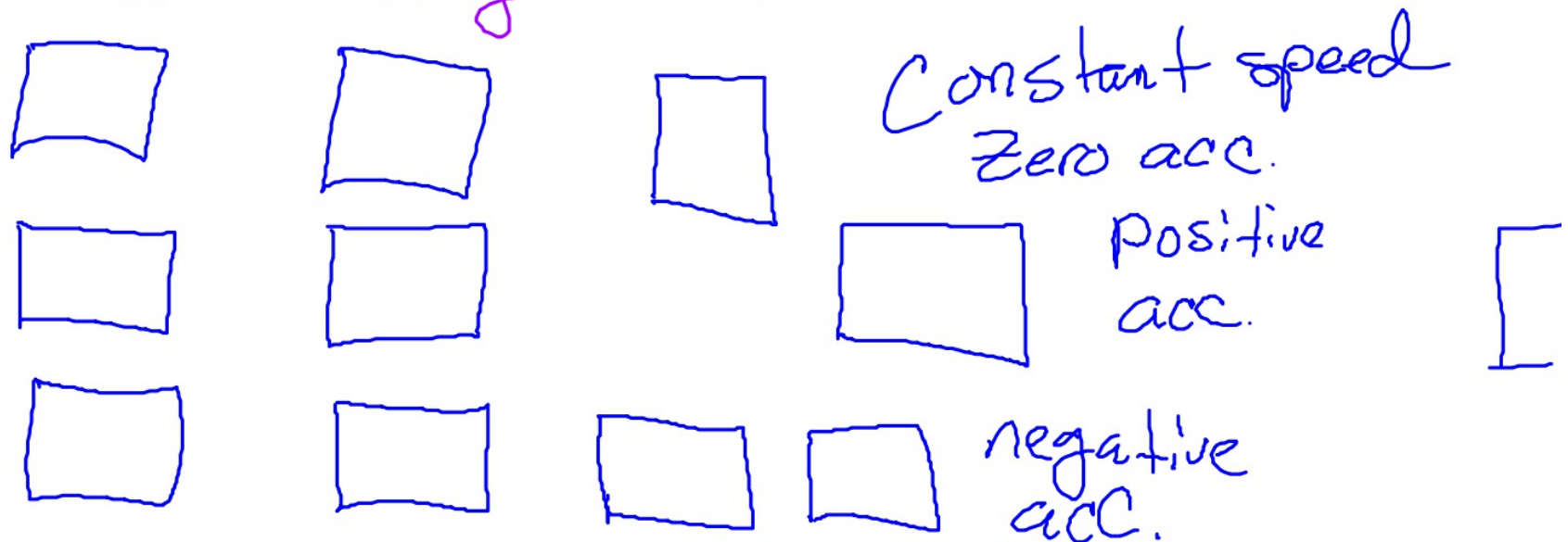
IWBAT define acceleration using words and an equation; calculate speed, distance, and time using this equation; and interpret distance-time and velocity-time graphs for different types of motion.



## Section 4: Graphing Motion: Distance, Velocity, and Acceleration Physics Talk (p.58)

Negative acceleration— speed decreases,  
accelerating in the opposite direction

positive acceleration— speed increases,  
accelerating in the direction of motion



IWBAT define acceleration using words and an equation; calculate speed, distance, and time using this equation; and interpret distance-time and velocity-time graphs for different types of motion.

## Section 4: Graphing Motion: Distance, Velocity, and Acceleration

"Acceleration is the change of ~~speed~~."

velocity

1. What is correct about this?
2. What can be improved?

change in speed or direction.

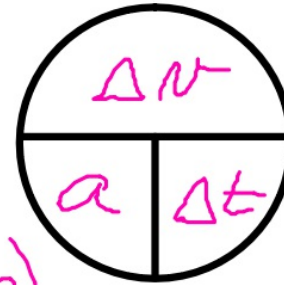
## Section 4: Graphing Motion: Distance, Velocity, and Acceleration

Physics Talk (p.58)

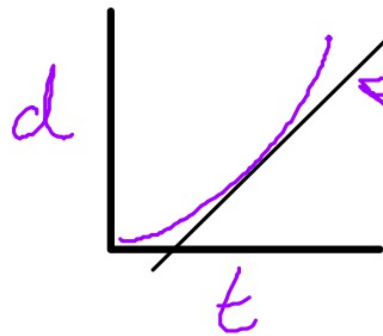
equation

$$a = \frac{\Delta v}{\Delta t} \quad \begin{matrix} (\text{m/s}) \\ (\text{s}) \end{matrix}$$

acceleration  $(\text{m/s/s}) (\text{m/s}^2)$

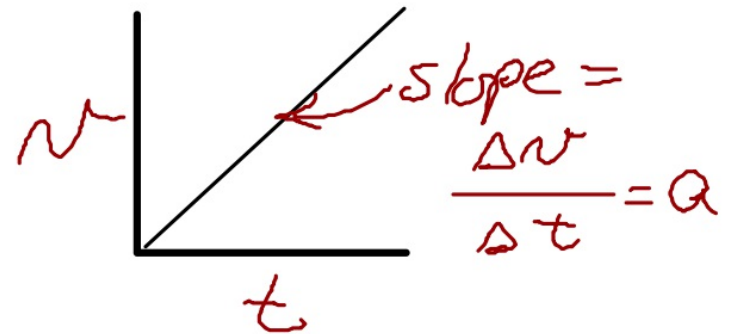


graphs



tangent line  
Slope = instantaneous speed

$$\frac{\Delta d}{\Delta t} = v$$



## Section 4: Graphing Motion: Distance, Velocity, and Acceleration

Checking up (p.64) #1-3  
Physics to Go (p.68) #7, 9, 17

$$a = \frac{v_f - v_i}{\Delta t}$$

$$v_{av} = \frac{\Delta d}{\Delta t}$$

After conversing with one partner, answer the What Do You Think Now on pg. 66 and record your answer on your index card.

IWBAT define acceleration using words and an equation; calculate speed, distance, and time using this equation; and interpret distance-time and velocity-time graphs for different types of motion.

# Units



Mini-challenge (p. 72)  
(40 min.)

2/05/16

Look over the requirements for the chapter challenge. As a team, write a paragraph for your challenge relating to the topics covered in sections one, three, and four.

With the remaining time of the 40 minutes, make sure you have updated your individual physics vocabulary resource for the first seven words listed for chapter 1 and any additional new words of which you wish to keep track.

Section 5: Negative Acceleration:  
Braking Your Automobile

p.75

2/08/16

WDYS

Trees/woods, guy stomping on his brakes, moose is crossing the road, guy looks scared he cannot stop, speed lines & flying papers behind car, smoke coming from tire, back tires coming off the ground - tried to stop instantly, sad moose - likely to get hit

WDYT

speed, reaction time, how far away from the animal you were when you saw it, working brakes,

## Section 5: Negative Acceleration: Braking Your Automobile

p.75

2/08/16

I will

- Plan and carry out an experiment to relate braking distance to initial speed, determine braking distance
- Examine acceleration by seeing how varying the initial speed changes the braking distance.

Via

- Participating in collaborative experiments
- Team and whole class discussions to clarify key concepts
- Collaboratively answering questions targeting key concepts



## Section 5: Negative Acceleration: Braking Your Automobile

Investigate p.75

**your plan must include :**

- Materials needed**
- individual jobs ( how will things be accomplished ? )**

I will plan and carry out an experiment to relate braking distance to initial speed, determine braking distance, and examine acceleration by seeing how varying the initial speed changes the braking distance.

## Section 5: Negative Acceleration: Braking Your Automobile

Physics Talk (p.78)

$$a = \frac{0 - v_i}{\Delta t} = \frac{-v_i}{\Delta t}$$

$$a = \frac{\Delta v}{\Delta t}$$

$$a = \frac{v_f - v_i}{\Delta t}$$

$+a$   $\xrightarrow{\text{motion}}$   
 $\xrightarrow{a}$

$-a$   $\xrightarrow{\text{motion}}$   
 $\xleftarrow{a}$



I will plan and carry out an experiment to relate braking distance to initial speed, determine braking distance, and examine acceleration by seeing how varying the initial speed changes the braking distance.

## Section 5: Negative Acceleration: Braking Your Automobile

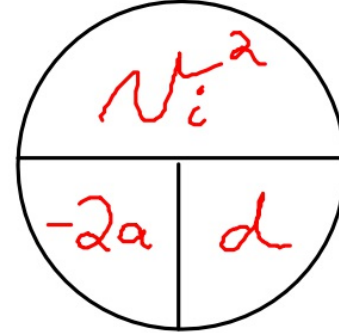
Calculating Braking Distance

$$v_f^2 = 2ad + v_i^2$$

↑  
braking distance

$$0 = 2ad + v_i^2 \quad \text{full stop}$$

$$v_i^2 = -2ad$$



## Section 5: Negative Acceleration: Braking Your Automobile

Checking up (p.82) #1-3  
Physics to Go (p.88) #2, 4, & 11

I will plan and carry out an experiment to relate braking distance to initial speed, determine braking distance, and examine acceleration by seeing how varying the initial speed changes the braking distance.